We claim:

1. A method of determining a transit delay between a first node and a second node in a hierarchical network connected to both the first node and the second node, the method comprising:

a) sending a first signal from a common node to the first node;

b) receiving a first response signal at the common node from the first node in response to the first signal;

c) determining a first round trip time, the first round trip time being a time elapsed between steps a) and b);

d) sending a second signal from the common node to the second node;

e) receiving a second response signal at the common node from the second node in response to the second signal;

f) determining a second round trip time, the second round trip time being a time elapsed between steps d) and e); and

g) calculating the transit delay between the first node and the second node according to the formula

$$D(X,Y) = | R(NMC,X) - R(NMC,Y) | /2$$

where

D(X,Y) is the transit delay between first node X and second node Y;

R(NMC,X) is the first round trip time;

R(NMC,Y) is the second round trip time; and

NMC is the common node.

2. A method as in claim 1 wherein at least one of the first and second nodes are directly connected to the common node.

3. A method as in claim 1 wherein at least one of the first and second nodes are indirectly connected to the common node.

4. A method as in claim 1 wherein the common node is a network management computer.

5. A method as in claim 1 wherein the hierarchical network is a portion of a mesh network.

6. A method of determining a total transit delay between a start node and an end node in a network the method comprising:

a) determining interim transit delays between adjacent nodes in a communications path between the start node and the end node; and

b) calculating the total transit delay between the start node and the end node by adding up the interim transit delays.

7. A method as in claim 6 wherein the network is hierarchical and step a) is accomplished by using a common node and including the steps:

a) sending a first signal from the common node to the first node;

b) receiving a first response signal at the common node from the first node in response to the first signal;

c) determining a first round trip time, the first round trip time being a time elapsed between steps a) and b);

d) sending a second signal from the common node to the second node;

e) receiving a second response signal at the common node from the second node in response to the second signal;

f) determining a second round trip time, the second round trip time being a time elapsed between steps d) and e); and

g) calculating the transit delay between the first node and the second node according to the formula

$$D(X,Y) = |R(NMC,X) - R(NMC,Y)|/2$$

where

D(X,Y) is the transit delay between first node X and second node Y;

R(NMC,X) is the first round trip time;

R(NMC,Y) is the second round trip time; and

NMC is the common node;

wherein the first node and the second node are adjacent nodes.

8. A method as in claim 7 wherein the hierarchical network is a portion of a mesh network.

9. A method as in claim 7 wherein at least one of the first and second nodes are directly connected to the common node.

10. A method as in claim 7 wherein at least one of the first and second nodes are indirectly connected to the common node.

11. A method as in claim 7 wherein step a) includes subdividing the network into subnetworks, each subnetwork being hierarchical.

12. A method as in claim 11 including determining interim transit delays between adjacent nodes in at least one of the subnetworks.

13. A method of determining the quality of communications between two nodes in a network, the method comprising:

a) measuring a transit delay between the two nodes at different times resulting in a plurality of transit delay measurements;

b) calculating a jitter among the plurality of time delay measurements; and

c) determining if the jitter exceeds a predetermined threshold value.

14. A method as in claim 13 wherein the network is a hierarchical network and the transit delay is measured between a first node and a second node using the following method:

a) sending a first signal from a common node to the first node;

b) receiving a first response signal at the common node from the first node in response to the first signal;

c) determining a first round trip time, the first round trip time being a time elapsed between steps a) and b);

d) sending a second signal from the common node to the second node in response to the second signal;

e) receiving a second response signal at the common node from the second node in response to the second signal;

f) determining a second round trip time, the second round trip time being a time elapsed between steps d) and e); and

g) calculating the transit delay between the first node and the second node according to the formula

$$D(X,Y) = |R(NMC,X) - R(NMC,Y)|/2$$

where

D(X,Y) is the transit delay between first node X and second node Y;

R(NMC,X) is the first round trip time;

R(NMC,Y) is the second round trip time; and

NMC is the common node.

15. A method as in claim 13 wherein the transit delay is measured between a start node and an end node in a hierarchical network using the following method:

a) determining interim transit delays between adjacent nodes in a communications path between the start node and the end node; and

b) calculating the total transit delay between the start node and the end node by adding up the interim transit delays.

16. A method as in claim 14 wherein the hierarchical network is a portion of a mesh network.

17. A method as in claim 15 wherein the hierarchical network is a portion of a mesh network.

18. A method as in claim 13 wherein step c) includes determining if at least one of the transit delay measurements exceeds a predetermined threshold value.

19. A method of determining a jitter between two transit delay measurements between two nodes, the method comprising:

calculating the jitter based on

$$J(A,D,t) = D(A,D,t_2) - D(A,D,t_1))$$

where

$J(A,D,t)$ is the jitter between the two transit delay measurements;

$D(A,D,t_1)$ is one of the two transit delay measurements taken at time t_1;

$D(A,D,t_2)$ is the other of the two transit delay measurements taken at time t_2; and

A and D are the two nodes between which the transit delay is measured.

20. A method as in claim 19 wherein the two nodes are directly connected to each other.

21. A method as in claim 19 wherein the two nodes are indirectly connected to each other.

22. A method of determining a total jitter between a start node and an end node in a network, the method comprising:

a) determining interim jitters in transit delays between adjacent nodes in a communications path between the start node and the end node;

b) calculating the total jitter in transit delays between the start node and the end node by adding up the interim jitters.

23. A method of determining a jitter between a plurality of transit delay measurements between two nodes, the method comprising :

calculating the jitter based on

$$J(A,B) = \frac{\sqrt{\sum_{i=1}^{M} D(A,B,i)^2}}{\sum_{i=1}^{M} D(A,B,i)}$$

where

J(A,B) is the jitter between the plurality of transit delay measurements;

D(A,B,i) is the i^{th} transit delay measurement among the plurality of transit delay measurements; and

M is the number of transit delay measurements.

24. A method as in claim 23 wherein the two nodes are directly connected to each other.

25. A method as in claim 23 wherein the two nodes are indirectly connected to each other.

26. A method of determining a signal processing time in a node, the method comprising:

a) determining at least one round trip delay time of a transmission between a node A and a node K;

b) determining a round trip delay time of a transmission between a node B and a node K;

c) determining a lowest recorded value for the round trip delay time between node A and node K;

d) calculating the signal processing time through node A according to:

$$P(A) = R(K,B) - \text{minimum } (R(K,A))$$

where

P(A) is the signal processing time through node A;

R(K,B) is a round trip delay time between node B and node K; and

(minimum (R(K,A)) is the lowest recorded value for the round trip delay time between node A and node K.